1508 to block 1512 and the page is transmitted over the alternative system. In the case of the AMPS system, the page information may be transmitted as a momentary interruption in an ongoing conversation, as information provided on a command channel, as subaudible information (e.g. in a band from 0 to 300 Hz), or by another appropriate method.

CM I claim:

1. A radio frequency management system for reallocation of radio spectrum among a plurality of wireless communication networks using differing radio frequency modulation protocols and differing radio frequencies to communicate with a plurality of frequency and protocol agile portable radio devices each of which is responsive to portable radio device control signals to change its operating frequency and modulation protocol, comprising

capacity detection means for generating a frequency request signal upon determining that a first wireless communication network operating using a first radio frequency spectrum allocated to said first wireless communication network and using a first modulation protocol, is at or near full capacity,

frequency reallocating means responsive to a frequency request signal for reassigning temporarily radio spectrum from a second wireless communication network operating using a second radio frequency spectrum allocated to said second wireless communication network and different from said first radio frequency spectrum and using second modulation protocol, to the first communication network determined by said capacity detection means to be at or near fill capacity, and

means for causing portable radio control signals in at least some of the frequency and protocol agile portable radio devices to change their operating frequency and modulation protocol to permit the portable radio devices so changed to communicate over the temporarily reassigned radio spectrum.

2. A radio frequency management system as defined in claim 1, further including a plurality of frequency and protocol agile portable radio devices for facilitating wireless communication over any one of a plurality of wireless communication networks at least some of which may be available and operating at a given time and location using differing radio frequency modulation protocols and over differing radio frequencies, each of which includes

a frequency agile radio transceiver operating at any one frequency of a plurality of radio frequencies appropriate for each of the plurality of wireless communication networks, said one frequency selected in response to a frequency control signal,

a digital interface circuit for interconnecting said frequency agile radio transceiver with external digital signal processing devices to allow digital signal information to be sent and received over said frequency agile radio transceiver,

protocol agile operating circuit means for operating said frequency agile radio transceiver and said digital interface circuit in accordance with any one modulation protocol of a plurality of modulation protocols, said one modulation protocol selected in response to a protocol control signal, and

adaptive control means for determining which wireless communications networks are available at a given location and time, for accessing a selected wireless communication network and for generating the frequency control signal and the protocol control signal in response to a user defined criteria to cause the device to

communicate with the selected wireless communication network using a frequency and modulation protocol suitable for transmission of said digital signal information over said selected wireless communications network.

3. The radio frequency management system defined in claim 2, wherein said adaptive control means selects the wireless communication network based on the least cost.

4. The radio frequency management system as defined in claim 2, wherein said adaptive control means selects the wireless communication network based on the quality of the radio transmission link connecting said frequency agile transceiver and the selected wireless communication network.

5. The radio frequency management system as defined in claim 2, wherein said adaptive control means selects the wireless communication network based on the probability of being dropped from the network.

6. The radio frequency management system as defined in claim 2, wherein said adaptive control means selects the wireless communication network based on the security of the radio transmission link connecting said frequency agile transceiver and the selected wireless communication network.

7. The radio frequency management system as defined in claim 2, wherein said adaptive control means selects the wireless communication network based on prior experience with specific wireless communication networks.

8. The radio frequency management system as defined in claim 2, wherein said adaptive control means selects the wireless communication network based on the combined determination of two or more of the following:

the cost of using the wireless communication network,

the quality of the transmission link connecting said frequency agile transceiver and the selected wireless communication network,

prior experience with specific wireless communication networks,

the potential of being dropped from the network, or

the security of the radio transmission link connecting said frequency agile transceiver and the selected wireless communication network.

9. The radio frequency management system as defined in claim 2, wherein said adaptive control means communicates with selected wireless communication networks to determine on a real time basis the operating characteristics of the corresponding wireless communication network.

10. The radio frequency management system as defined in claim 2, further including a modem means operating to perform at least one of modulation or demodulation of a carrier signal with user data.

11. The radio frequency management system as defined in claim 10, further including a data processor means for processing digital data transmitted over said frequency agile transceiver.

12. The radio frequency management system as defined in claim 11 for use with wireless communication networks having call placement and call answering functions, wherein said data processor means causes said frequency agile transceiver to control telephone call placement and call answering functions over wireless communication networks having such telephone functions.

13. A method for reallocation of radio frequency spectrum among a plurality of wireless communication networks at least some of which may be available and operating at a given time and location using differing radio frequency

modulation protocols and over differing radio frequencies to communicate with a plurality of frequency and protocol agile portable radio devices each of which is responsive to portable radio device control signals to change its operating frequency and modulation protocol, comprising the steps of

generating a frequency request signal upon determining that a first wireless communication network is at or near full capacity.

reassigning temporarily in response to said frequency request signal radio spectrum from a wireless communication network utilizing less of its normally assigned radio frequency to the communication network determined to be at or near full capacity, and

causing portable radio control signals in at least some of the frequency and protocol agile portable radio devices to change their operating frequency and transmission protocol to permit the portable radio devices so changed to communicate over the temporarily reassigned radio spectrum.

14. A method as defined in claim 13, comprising the further steps of

operating a frequency agile radio transceiver at any one frequency of a plurality of radio frequencies appropriate for each of the plurality of wireless communication networks, said one frequency selected in response to a frequency control signal,

interconnecting said frequency agile radio transceiver with external digital signal processing devices to allow digital signal information to be sent and received over said frequency agile radio transceiver,

operating said frequency agile radio transceiver in accordance with any one modulation protocol of a plurality of modulation protocols, said one modulation protocol selected in response to a protocol control signal, and

determining which wireless communications networks are available at a given location and time and accessing a selected wireless communication network by generating the frequency control signal and the protocol control signal in response to a user defined criteria to cause the device to communicate with the selected wireless communication network using a frequency and modulation protocol suitable for transmission of said digital signal information over said selected wireless communications network.

15. The method as defined in claim 14, wherein said step of selecting the wireless communication network is based on the least cost.

16. The method as defined in claim 14, wherein said step of selecting the wireless communication network is based on the quality of the radio transmission link connecting said frequency agile transceiver and the selected wireless communication network.

17. The method as defined in claim 14, wherein said step of selecting the wireless communication network is based on the probability of being dropped from the network.

18. The method as defined in claim 14, wherein said step of selecting the wireless communication network is based on the security of the radio transmission link connecting said frequency agile transceiver and the selected wireless communication network.

19. The method as defined in claim 14, wherein said step of selecting the wireless communication network is based on prior experience with specific wireless communication networks.

20. The method as defined in claim 14, wherein said step of selecting the wireless communication network is based on the combined determination of two or more of the following:

the cost of using the wireless communication network,

the quality of the transmission link connecting said frequency agile transceiver and the selected wireless communication network,

prior experience with specific wireless communication networks,

the probability of being dropped from the network, or

the security of the radio transmission link connecting said frequency agile transceiver and the selected wireless communication network.

21. The method as defined in claim 14, further including the step of engaging in an electronic handshake with selected wireless communication networks to determine on a real time basis the cost for desired services and the operating characteristics of the corresponding wireless communication network.

22. The method as defined in claim 14, further including the step of causing said frequency agile transceiver to control telephone call placement and call answering functions over wireless communication networks having such telephone functions.

23. A radio frequency management system for providing information useful in selecting among a plurality of wireless communication networks having different and variable oper-

ating characteristics and accessed by a plurality of portable radio devices each of which is capable of accessing any of the plurality of wireless communication networks comprising:

wireless communication network monitoring means for monitoring the current network load of each of the plurality of wireless communication networks;

processing means connected with said network monitoring means for receiving a signal indicative of said current network load and for generating a signal representing current operational characteristics of each of the wireless communications networks in response thereto;

network information transmission means connected with said processing means for receiving said signal and for transmitting said operational characteristics for each of the plurality of wireless communication networks to each of the plurality of portable radio devices thereby allowing each of the portable wireless devices to selectively access one of said plurality of wireless communications networks in response to said operational characteristics.

24. The system of claim **23** wherein said operation characteristics include the cost for use of the wireless communication network.

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25. In a cellular radio communication network operating over a predetermined frequency range subdivided in frequency into frequency bands, said network comprising at least a first independent radio communication system and a second independent radio communication system each providing radio telecommunication service over a common geographic region, a method for using said frequency range comprising the steps of:

assigning from said predetermined frequency range at least one first frequency band to be used as a control channel by said first independent radio communication system;

assigning from said predetermined frequency range at least one second frequency band to be used as a control channel by said second independent radio communication system; and

sharing by said first independent radio communication system and said second independent radio communication system frequency bands in the portion of said predetermined frequency range not assigned as control channels to provide radio telecommunication service to a plurality of subscribers located in said common geographic region.

26. The method of claim 25 wherein said step of sharing comprises sharing in a coordinated and synchronized manner between said first independent radio communication system and said second independent radio communication system.

27. The method of claim 26 wherein said step of sharing comprises the step of assigning frequency and time slot combinations in response to channel set-up requests received from said first independent radio communication system

and said second independent radio communication system.

28. The method of claim 25 wherein said first independent radio communication system and said second independent radio communication system are designed to provide radio telecommunication services using TDMA.

29. In a cellular radio communication network operating over a predetermined frequency range subdivided in frequency into frequency bands, said network comprising at least a first independent radio communication system and a second independent radio communication system each providing radio telecommunication service over a common geographic region, a method for using said frequency range comprising the steps of:

assigning from said predetermined frequency range at least one first frequency band to be used as a control channel by said first independent radio communication system;

assigning from said predetermined frequency range at least one second frequency band to be used as a control channel by said second independent radio communication system;

assigning from said predetermined frequency range a predetermined portion of said predetermined frequency range to be used by said first independent radio communication system to provide radio telecommunication service to a plurality of subscribers located in said geographic region; and

sharing by said first independent radio communication system and said second independent radio communication system frequency bands in the portion of said predetermined frequency range not assigned as control channels or assigned exclusively to said first independent radio communication system, to

provide radio telecommunication service to the plurality of subscribers located in said geographic region.

30. The method of claim 29 wherein said step of sharing comprises sharing in a coordinated and synchronized manner between said first independent radio communication system and said second independent radio communication system.

31. The method of claim 30 wherein said step of sharing is controlled by a processor which assigns frequency and time slot combinations in response to channel set-up requests received from said first independent radio communication system.

32. The method of claim 29 wherein said first independent radio communication system and said second independent radio communication system are designed to provide radio telecommunication services using TDMA.

33. In a cellular radio communication network comprising a plurality of systems each providing service within a common geographic area, and operating within a frequency range comprising a plurality of frequency bands, a method of allocating frequency bands to said systems, said method comprising the steps of:

assigning one or more first frequency bands to each of said systems, wherein said first frequency bands are used exclusively for control channels within the systems to which each is assigned; and

allocating one or more second frequency bands to said systems on a shared

basis, wherein said second frequency bands are used for traffic channels within the system to which each is currently allocated.

34. The method of claim 33 wherein said step of allocating comprises:

allocating frequency bands from said second frequency bands for traffic channels within a first one of the plurality of systems independently of the allocation of said second frequency bands within a second one of the plurality of systems.

35. The method of claim 33 wherein said step of allocating comprises:

allocating one or more second frequency bands to each of said systems depending on the allocation of said second frequency bands to the other systems of said network.

36. The method of claim 35 wherein said plurality of systems communicate over time division multiplexed channels, each channel defined by a frequency band and a time slot assignment, and wherein said step of allocating comprises:

receiving a channel allocation request from an originating one of said systems;

determining if channels are available in said network; and

in response to an affirmative determination:

transmitting a channel allocation assignment to said originating system.

37. The method of claim 36 wherein said step of determining if channels are available in said network comprises searching for unused

frequency/time slot combinations.

38. A cellular communications network providing service over a frequency range comprising a plurality of first frequency bands and a plurality of second frequency bands, said network comprising:

a plurality of radio communications systems, each of said systems providing service in a coverage area, the coverage areas of each of said systems having a common area, each of said systems being exclusively assigned one or more of said first frequency bands for use as control channels for each system and providing service over said plurality of second frequency bands on a shared basis.

39. The cellular communications network of claim 38 in which one or more of said systems is exclusively assigned one or more fixed frequency bands for providing service in addition to providing service over said plurality of shared frequency bands.

40. The cellular communications network of claim 38 further comprising means for allocating said shared frequency bands for communications on a coordinated and synchronized basis.

41. The cellular communications network of claim 38 in which each of said radio communications systems comprises one or more mobile telephone switching offices, and said network further comprises means for allocating unused frequency bands of said second frequency bands among said systems on a shared basis, said means for allocating connected to each of said mobile telephone switching offices.

42. A wireless communication system organized to promote user driven competition among a plurality of commercially independent wireless service networks operating with differing frequencies and/or differing protocols and serving, within a given geographic region, a population of portable radio devices that are sufficiently frequency and protocol agile to allow access to more than one of the wireless service networks, comprising

a. an accessing circuit associated with each portable radio device for providing access to any one of a plurality of the wireless service networks by requesting access and, if available, establishing access in response to an access control signal that adjusts the radio frequency and the protocol of the associated portable radio device as necessary to access the selected wireless service network,

b. control signal generator for generating the access control signal in response to user defined criteria to cause access to the wireless service network that best satisfies the user criteria, and

c. a frequency reallocator for increasing the capacity of any one of the wireless service networks as the aggregate demand for access to that wireless service network increases by allowing portions of the radio spectrum, otherwise available to another wireless service network, to be used by the wireless service network experiencing increased demand.

43. A wireless communication system organized to promote competition among a plurality of commercially independent wireless service networks operating with differing frequencies and/or differing protocols and serving, within a given geographic region, a population of user held portable radio devices that are sufficiently frequency and protocol agile to allow access to a plurality of the wireless service networks, comprising

a. a frequency reallocator for increasing the capacity of any one of the wireless service networks as the aggregate demand for access to that wireless service network increases by allowing portions of the radio spectrum, otherwise available to another wireless service network, to be used by the wireless service network experiencing increased demand,

b. an accessing circuit associated with each portable radio device for providing access to any one of a plurality of the wireless service networks by requesting access and, if available, establishing access in response to an access control signal that adjusts the radio frequency and the protocol of the associated portable radio device as necessary to access the selected wireless service network, and

c. control signal generator for generating an access control signal in response to control instructions received from a wireless service network which has borrowed frequency from another wireless service network through operation of said frequency reallocator to cause said accessing circuit to access to the wireless service

network on the reallocated frequency.

44. A wireless communication system organized to promote user driven competition among a plurality of commercially independent wireless service providers, comprising

a. a plurality of independent wireless service networks operated by the wireless service providers to provide wireless services within a common geographic region using differing frequencies and/or differing protocols,

b. a plurality of portable radio devices, located within the geographic region, that are sufficiently frequency and protocol agile to allow access to more than one of the wireless service networks, each said portable radio device including

i. an accessing circuit for providing access to any one of a plurality of the wireless service networks by requesting access and, if available, establishing access in response to an access control signal that adjusts the radio frequency and the protocol of the associated portable radio device as necessary to access the selected wireless service network,

ii. memory for storing a user criteria for selecting a wireless service, and

iii. control signal generator for automatically generating the access control signal in response to an automated selection of the wireless network that best satisfies the stored criteria for wireless service and for causing said accessing circuit to access the wireless service network identified by the access control signal generated.

45. A wireless communication system organized to promote user driven competition among a plurality of commercially independent wireless service networks operating with differing frequencies and serving, within a given geographic region, a population of portable radio devices that are sufficiently frequency agile to allow access to more than one of the wireless service networks, comprising

a. an accessing circuit associated with each portable radio device for providing access to any one of a plurality of the wireless service networks by requesting access and, if available, establishing access in response to an access control signal that causes said accessing circuit to adjust the radio frequency of the associated portable radio device as necessary to access the selected wireless service network,

b. network information transmitter for transmitting operational characteristics for more than one of the wireless service networks to each of the portable radio devices

c. control signal generator associated with each portable radio device for generating the access control signal in response to receipt of transmitted operational characteristics for more than one of the wireless service networks, and

d. a frequency reallocator for increasing the capacity of any one of the wireless service networks as the aggregate demand for access to that wireless service network increases by allowing portions of the radio spectrum, otherwise available to another wireless service network, to be used by the wireless service network experiencing increased demand.

46. A wireless communication system organized to permit maximum utilization of the available radio spectrum assigned to a plurality of independent wireless service networks operating over differing communication channels to provide wireless service within a common geographic area to a plurality of portable radio devices that are sufficiently frequency agile in response to command signals supplied to the portable devices by the independent wireless service to allow selective access by each portable radio device to more than one of the wireless service networks,

a. an accessing circuit associated with each portable radio device for providing access to any one of a plurality of the wireless service networks by requesting access and, if available, establishing access in response to an access control signal that causes said accessing circuit to adjust the radio frequency of the associated portable radio

device as necessary to access the selected wireless service network,

b. a frequency reallocator for increasing the capacity of any one of the wireless service networks as the aggregate demand for access to that wireless service network increases by allowing portions of the radio spectrum, otherwise available to another wireless service network, to be used by the wireless service network experiencing increased demand, and

c. access control signal generator associated with each portable radio device for generating an access control signal that will cause a portable radio device, in response to receipt of a command signal from that wireless service network, to access a wireless service network using a frequency that has been reallocated to that wireless service network by said frequency reallocator.